

Lupus Nephritis

National Kidney and Urologic Diseases Information Clearinghouse



What is lupus nephritis?

Lupus nephritis is kidney inflammation caused by systemic lupus erythematosus (SLE or lupus). SLE is an autoimmune disease—a disorder in which the body's immune system attacks the body's own cells and organs. Up to 60 percent of people with SLE are diagnosed with lupus nephritis, which can lead to significant illness and even death.¹

What are the kidneys and what do they do?

The kidneys are two bean-shaped organs, each about the size of a fist. They are located just below the rib cage, one on each side of the spine. Every day, the two kidneys filter about 120 to 150 quarts of blood to produce about 1 to 2 quarts of urine, composed of wastes and extra fluid. The urine flows from the kidneys to the bladder through tubes called ureters. The bladder stores urine until releasing it through urination.

What are the symptoms of lupus nephritis?

The symptoms of lupus nephritis may include high blood pressure, foamy urine, and edema—swelling, usually in the legs, feet, or ankles and less often in the hands or face. Kidney problems often develop at the same

time or shortly after lupus symptoms appear and can include

- joint pain or swelling
- muscle pain
- fever with no known cause
- red rashes, often on the face, which are also called butterfly rashes because of their shape

How is lupus nephritis diagnosed?

Lupus nephritis is diagnosed through urine and blood tests and a kidney biopsy:

- **Urinalysis.** Urinalysis is testing of a urine sample. The urine sample is collected in a special container in a health care provider's office or commercial facility and can be tested in the same location or sent to a lab for analysis. For the test, a nurse or technician places a strip of chemically treated paper, called a dipstick, into the urine. Patches on the dipstick change color when blood or protein is present. A high number of red blood cells or high levels of protein in the urine indicate kidney damage.
- **Blood test.** A blood test involves drawing blood at a health care provider's office or commercial facility and sending the sample to a lab for analysis. The blood test can show high levels of creatinine, a waste product of normal muscle breakdown excreted by

¹Lee YH, Woo JH, Choi SJ, Ji JD, Song GG. Induction and maintenance therapy for lupus nephritis: a systematic review and meta-analysis. *Lupus*. 2010;19:703–710.

the kidneys, which increases when the kidneys are not functioning well.

- **Biopsy.** A biopsy is a procedure that involves taking a small piece of kidney tissue for examination with a microscope. The biopsy is performed by a health care provider in a hospital with light sedation and local anesthetic. The health care provider uses imaging techniques such as ultrasound or a computerized tomography scan to guide the biopsy needle into the kidney. The kidney tissue is examined in a lab by a pathologist—a doctor who specializes in diagnosing diseases. The test can confirm a diagnosis of lupus nephritis, determine how far the disease has progressed, and guide treatment. The American College of Rheumatology recommends biopsies for all people with evidence of active lupus nephritis that has not been previously treated.

How is lupus nephritis treated?

Lupus nephritis is treated with medications that suppress the immune system, so it stops attacking and damaging the kidneys. Standard treatment includes a corticosteroid, usually prednisone, to reduce inflammation in the kidneys. An immunosuppressive medication, such as cyclophosphamide or mycophenolate mofetil, is typically used with prednisone. These medications—when taken as prescribed by a health care provider—further decrease the activity of the immune system and block the body's immune cells from attacking the kidneys directly or making antibodies that attack the kidneys. Antibodies are proteins made

by the immune system to protect the body from foreign substances such as bacteria or viruses. Hydroxychloroquine, a medication for treating SLE, should also be prescribed or continued for people with lupus nephritis.

People with lupus nephritis that is causing high blood pressure may need to take medications that lower their blood pressure and can also significantly slow the progression of kidney disease. Two types of blood pressure lowering medications, angiotensin-converting enzyme (ACE) inhibitors and angiotensin receptor blockers (ARBs), have proven effective in slowing the progression of kidney disease. Many people require two or more medications to control their blood pressure. In addition to an ACE inhibitor or an ARB, a diuretic—a medication that helps the kidneys remove fluid from the body—may be prescribed. Beta blockers, calcium channel blockers, and other blood pressure medications may also be needed.

Blood pressure is written with two numbers separated by a slash, 120/80, and is said as “120 over 80.” The top number is called the systolic pressure and represents the pressure as the heart beats and pushes blood through the blood vessels. The bottom number is called the diastolic pressure and represents the pressure as blood vessels relax between heartbeats. High blood pressure is a systolic pressure of 140 or above or a diastolic pressure of 90 or above.²

²James PA, Oparil S, Carter BL, et al. 2014 evidence-based guideline for the management of high blood pressure in adults—report from the panel members appointed to the Eighth Joint National Committee (JNC 8). *The Journal of the American Medical Association*. Published online December 18, 2013.

What are the possible complications of lupus nephritis?

In many cases, treatment is effective in completely or partially controlling lupus nephritis, resulting in few, if any, further complications. However, even with treatment, 10 to 30 percent of people with lupus nephritis develop kidney failure, described as end-stage renal disease when treated with blood-filtering treatments called dialysis or a kidney transplant.³ Scientists cannot predict who will or will not respond to treatment. The most severe form of lupus nephritis is called diffuse proliferative nephritis. With this type of illness, the kidneys are inflamed, many white blood cells invade the kidneys, and kidney cells increase in number, which can cause such severe damage that scars form in the kidneys. Scars are difficult to treat, and kidney function often declines as more scars form. People with suspected lupus nephritis should get diagnosed and treated as early as possible to prevent such chronic, or long lasting, damage.

People with lupus nephritis are at a high risk for cancer, primarily B-cell lymphoma—a type of cancer that begins in the cells of the immune system. They are also at a high risk for heart and blood vessel problems.

Eating, Diet, and Nutrition

Eating, diet, and nutrition have not been shown to play a role in causing or preventing lupus nephritis. People with kidney disease that progresses may need to talk with a health care provider about changes they may need to make to their diet. People with lupus nephritis and high blood pressure may benefit from reducing sodium intake, often from salt. For more information about nutrition in people with kidney disease, see the National Kidney and Urologic Diseases Information Clearinghouse (NKUDIC) fact sheets *Nutrition for Early Chronic Kidney Disease in Adults* and *Nutrition for Advanced Chronic Kidney Disease in Adults* at www.kidney.niddk.nih.gov.

³Ortega LM, Schultz DR, Lenz O, Pardo V, Contreras GN. Lupus nephritis: pathologic features, epidemiology and a guide to therapeutic decisions. *Lupus*. 2010;19:557–574.

Points to Remember

- Lupus nephritis is kidney inflammation caused by systemic lupus erythematosus (SLE or lupus).
- The symptoms of lupus nephritis may include high blood pressure, foamy urine, and edema.
- Lupus nephritis is diagnosed through urine and blood tests and a kidney biopsy.
- Lupus nephritis is treated with medications that suppress the immune system, so it stops attacking and damaging the kidneys. Standard treatment includes a corticosteroid, usually prednisone, to reduce inflammation in the kidneys. An immunosuppressive medication, such as cyclophosphamide or mycophenolate mofetil, is typically used with prednisone.
- People with lupus nephritis that is causing high blood pressure may need to take medications that lower their blood pressure, which can also significantly slow the progression of kidney disease.
- In many cases, treatment is effective in completely or partially controlling lupus nephritis, resulting in few, if any, further complications. However, even with treatment, 10 to 30 percent of people with lupus nephritis develop kidney failure.

Hope through Research

In recent years, researchers have learned a great deal about kidney disease. The National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) sponsors several programs aimed at better understanding all types of kidney disease, including lupus nephritis.

Abatacept and Cyclophosphamide Combination Therapy for Lupus Nephritis, funded under NIH clinical trial number NCT00774852, compares the addition of the experimental medication abatacept to standard cyclophosphamide therapy with cyclophosphamide therapy alone for treatment of lupus nephritis.

Immune System Related Kidney Disease, funded under NIH clinical trial number NCT00001979, studies patients with autoimmune diseases of the kidney, including lupus nephritis. The goal is to better understand the causes, signs, symptoms, and responses to medication of these diseases.

Clinical trials are research studies involving people. Clinical trials look at safe and effective new ways to prevent, detect, or treat disease. Researchers also use clinical trials to look at other aspects of care, such as improving the quality of life for people with chronic illnesses. To learn more about clinical trials, why they matter, and how to participate, visit the NIH Clinical Research Trials and You website at www.nih.gov/health/clinicaltrials. For information about current studies, visit www.ClinicalTrials.gov.

For More Information

Lupus nephritis is also classified as a glomerular disease. For more information, see the NKUDIC publication *Glomerular Diseases* at www.kidney.niddk.nih.gov.

The National Institute of Arthritis and Musculoskeletal and Skin Diseases offers the online publications *Systemic Lupus Erythematosus* and *The Many Shades of Lupus* (easy-to-read) at www.niams.nih.gov.

More information is also available from

**National Institute of Arthritis and
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Acknowledgments

Publications produced by the Clearinghouse are carefully reviewed by both NIDDK scientists and outside experts. This publication was reviewed by Brad Rovin, M.D., The Ohio State University.

You may also find additional information about this topic by visiting MedlinePlus at www.medlineplus.gov.

This publication may contain information about medications and, when taken as prescribed, the conditions they treat. When prepared, this publication included the most current information available. For updates or for questions about any medications, contact the U.S. Food and Drug Administration toll-free at 1-888-INFO-FDA (1-888-463-6332) or visit www.fda.gov. Consult your health care provider for more information.

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The National Kidney Disease Education Program (NKDEP) is an initiative of the National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health, U.S. Department of Health and Human Services. The NKDEP aims to raise awareness of the seriousness of kidney disease, the importance of testing those at high risk, and the availability of treatment to prevent or slow kidney disease.

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The National Kidney and Urologic Diseases Information Clearinghouse (NKUDIC) is a service of the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). The NIDDK is part of the National Institutes of Health of the U.S. Department of Health and Human Services. Established in 1987, the Clearinghouse provides information about diseases of the kidneys and urologic system to people with kidney and urologic disorders and to their families, health care professionals, and the public. The NKUDIC answers inquiries, develops and distributes publications, and works closely with professional and patient organizations and Government agencies to coordinate resources about kidney and urologic diseases.

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This publication is available at
www.kidney.niddk.nih.gov



National Institute of
Diabetes and Digestive
and Kidney Diseases

NIH Publication No. 14-4622
February 2014



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